

ABSTRACT OF THE DISCLOSURE

Boost converters, power supply apparatuses, electrical energy boost methods and electrical energy supply methods are described. According to one aspect, a boost converter includes an input configured to receive direct current electrical energy at a first voltage, an output configured to output direct current electrical energy at a second voltage higher than the first voltage, a plurality of switching devices coupled in series intermediate a positive terminal of the output and a ground, wherein one of the switching devices comprises a high side switching device coupled with the positive terminal and the other of the switching devices comprises a low side switching device coupled with the ground, drive circuitry configured to output a common control signal to control switching of the plurality of switching devices, a capacitor configured to capacitively couple the common control signal from the drive circuitry to the high side switching device, and wherein the control signal is configured to control the switching of the switching devices to boost the voltage of the received electrical energy of the first voltage to the second voltage.